Cardinal Health Technical Requirements for Serialization

Version 1.2

May 4, 2017

Contents

Version Notes

Version 1.1 – 05/13/2016 – Added additional requirements for AS2 exchange.

Version 1.2 – 05/04/2017 – HDMA replaced with HDA. Added numerous excerpts and illustrations from the "HDA Bar Coding Quick Start Guide". Updated "HDA Bar Coding Quick Start Guide" link. Added "Simplified Engagement Process" section. Added EPCIS 1.1 simplified example to include commission, aggregation and shipping example.

Cardinal Health Technical Requirements for Serialization

Introduction

The purpose of this document is to overview the EPCIS testing process and communicate technical requirements in order to facilitate the successful transmission and processing of EPCIS lot-level and serialized data pursuant to meeting current and future DSCSA requirements.

To meet the November 2023 regulation, Cardinal Health requires the use an EPCIS document that contains the DSCSA TI/TS along with unit-level and container-level serial numbers that indicate the containment hierarchy.

Before November 2023 we anticipate manufacturers to be on different preparation paths to implement EPCIS for full traceability and expect several scenarios occurring simultaneously for which we need to provide separate guidance. We understand your situation may change over time.

> Migration to a **DSCSA-compliant EPCIS lot-level file** to comply with current DSCSA requirements.
>
> Migration to a **DSCSA-compliant EPCIS serialized file**
>
> Sending **serial number aggregation only** using EPCIS in parallel with your current DSCSA lot-based methodology.
>
> (As of this writing we currently support EPCIS 1.1 and will begin supporting EPCIS 1.2 in late 2017. For partners with EPCIS 1.0 we may be able to accept files provided certain modifications be made by the partner first. By comparing your current files to the examples in this guide that will provide some idea where modifications may need to occur. In this situation it would be best to contact drugtracing@cardinalhealth.com to schedule a live call to discuss.)

Cardinal Health welcomes this opportunity to learn the costs and benefits of utilizing serialized product information along with you. In these early stages of testing where serialized EPCIS for DSCSA is not finalized, Cardinal Health is more concerned with testing various data exchange approaches and less concerned about compliance. As the November 2023 deadlines approach, we will focus more on exactly what is needed for compliance. Consequently it is possible that not all of the technical approaches we test today will meet our compliance needs in the future.

Simplified Engagement Process

If you would like to test with us, we ask that you please review the information in this guide and confirm you have serialized product available and/or the ability to transmit serialized data via EPCIS.

At a minimum, the prerequisites to start the test process include:

- Trading Partners have GTINs and GLNs they intend to use for testing identified.
- Trading Partners have their AS2 certificate and credentials ready to exchange. Our AS2 information is later in the guide with instructions/reminders. When we're ready to test we will provide you our AS2 certificate.
- Trading Partners have the ability to generate, verify and transmit EPCIS files – let us know which EPCIS version you will use. We can take modest-sized EPCIS files in an email attachment and process it manually if you are ready with everything except your AS2 setup.
- Trading Partners know which scenarios you want to test (for example, exchanging EPCIS DSCSA-compliant serialized files, EPCIS serial numbers only, with or without aggregation, etc.)
- If you wish to involve labels in testing scenarios, plan and identify how they will be incorporated into the test (e.g. email scanned images, mail labels, reference physical products shipped to our warehouse).
- Once you are ready, contact drugtracing@cardinalhealth.com to schedule a call to review next steps.

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

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Testing With Cardinal Health

With the uncertainty when manufacturers will begin passing serial numbers before 2023, Cardinal Health will not incorporate automated SGTIN validation as part of our Receiving process at this time. What this means for testing purposes is that our EPCIS system will be decoupled from our production receiving processes, and we will instead conduct tests using our EPCIS repository in a manual and highly controlled fashion, providing feedback on labeling, aggregation quality and DSCSA content (if applicable) for each Manufacturer who participates.

For situations where the partner is readying for permanent production transmissions, at the close of the test a permanent production arrangement can be negotiated provided both parties agree on readiness and anticipated consistency.

Requests for testing engagement can be sent to drugtracing@cardinalhealth.com .

If you wish only to have your barcodes evaluated at this time, requests and images can be sent to barcodes@cardinalhealth.com.

Expectations for Manufacturers
- We expect the Manufacturer or third party participants to be adept at:
    - Constructing and self-validating lot level or serialized level EPCIS files;
    - Implementing FDA labeling requirements following HDA and/or GS1 guidance;
    - Understanding DSCSA data element requirements as they relate to Transaction Data;
    - Understanding Master Data requirements for EPCIS exchange.
- You can exchange Master Data for the tests in advance (GLNs, GTINs, addresses, etc.) or you can incorporate master data in the EPCIS file. Please confirm with us.
- We require a technical single point of contact (or email distribution list).
- We require use of our email contact **EPCISsupport@cardinalhealth.com** for all correspondence.
- Mutual agreement on scenarios and scenario planning and sequence.
- Test scenarios we anticipate include, but are not limited to:
    - File transmissions;
        - EPCIS DSCSA-compliant Lot-level;
        - EPCIS DSCSA-compliant Serialized;
        - EPCIS serial numbers only, with or without aggregation.
    - Various methods for exchanging Master Data;
    - Serial number verification with manufacturer or 3rd party;
    - Exception processing (TBD pending GS1 EPCIS 1.2).

Test Goals (some or all depending on mutually agreed scenarios)
- Confirm electronic data delivery.
- Confirm completeness and data quality of TI/TH/TS.
- Using barcode labels or images, confirm serial number and/or aggregation accuracy with electronic feed.
- Confirm scenarios and document results and conclusions.

Test Process Overview
Due to limitations in this interim period before 2023 and the number of manufacturers that we anticipate approaching us for tests, we may need to limit the test to a fixed number of iterations which we will negotiate with the manufacturer.

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The steps below overview initial data exchange and testing, which may lead to production testing for serialized and aggregated product in the supply chain.

- **Initial Non-Production data exchange and testing** – Steps for preliminary testing, no accompanying physical shipment, repeatable as necessary:
    - Mutually agree/define scenarios.
    - Master Data exchange via EPCIS or Cardinal Health-provided spreadsheet.
    - Manufacturer provides PO information by defining PO, NDCs and quantities for scenario in advance. (PO can be bogus.)
    - Manufacturer provides initial electronic transmission (via email or non-prod URL).
    - If scenario requires, Manufacturer provides accompanying labels (either label stock, scanned barcode images, e.g.).
    - Cardinal Health will attempt to import the electronic information into our repository.
    - Cardinal Health will provide feedback on success or list reasons for failure.
    - Cardinal Health will evaluate any barcodes and provide feedback on content and acceptability.
    - Once usable electronic data and labels are in hand, Cardinal Health will scan labels to reconcile to the electronic data feed.

- **Optional testing in Production** if product is already serialized:
    - Manufacturer and Cardinal Health can coordinate receipt of a pre-determined shipment at our National Logistics Center in Groveport, Ohio. At this time this will be the only facility we will inspect product for test purposes.
    - Manufacturer will send an electronic file corresponding to the physical shipment which we will receive and import into our serial event repository.
    - We will hold the shipment receipt and open cases.
    - We will manually scan all case and item barcodes for the shipment which will update our serial event repository.
    - We will re-seal cases as needed and allow the shipment to go through normal Receiving.

- **Feedback** – For both non-production and production testing described above, Cardinal Health will provide feedback (as applicable) that will encompass:
    - Confirmation of cases counts and unit counts received;
    - Confirmation of parent-child relationships (serialization test only);
    - Confirmation of number of serial number matches (serialization test only);
    - List individual serial number mismatches (serialization test only);
    - List Lot and Expiration mismatches.
    - DSCSA data completeness and quality.

Important Reference Material

It is our desire to align tightly with GS1 standards and HDA industry guidance for serialization in order to minimize or eliminate any special requirements that manufacturers will need to follow for Cardinal Health. Our hope is that all companies in the supply chain will do the same so that efficiencies are maximized for everyone.

In recognition of that, and so that we don't duplicate guidance content published by those organizations, most of this document contains references to external documents published by FDA, GS1 and HDA.

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

Cardinal Health Technical Requirements for Serialization

Document publisher	Document Title
HDA	HDA Guidelines for Bar Coding in the Pharmaceutical Supply Chain Quick Start Guide. This guide published by the Healthcare Distribution Alliance provides a comprehensive and succinct list of information needed to understand the data elements at play for DSCSA as well as encode them on products governed under DSCSA.
GS1 US	GS1 US Healthcare Implementation Guide Reference this guide to applying GS1 EPCIS standards to U.S. Pharmaceutical Supply Chain to support DSCSA.
GS1	EPCIS and Core Business Vocabulary GS1 has guides for the EPCIS standard to be used in conjunction with the Core Business Vocabulary (CBV). Refer to these guides for a general understanding of EPCIS as it applies globally.
FDA	H.R. 3024; Drug Quality and Security Act (DQSA), Title II – Drug Supply Chain Security Act (DSCSA).

Note that sometimes these entities above do rearrange their websites periodically and our links above may not resolve correctly. If that happens, please search their websites for the documents – we do not forward copies. We do periodically review these links and revise as necessary.

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

Cardinal Health Technical Requirements for Serialization

Serialized Barcodes

Cardinal Health currently has the capability to make use of multiple barcoded serial number data carriers. Products must be serialized at the pallet, case, inner-pack and individual package levels.

If you wish only to have your barcodes evaluated at this time, requests and images can be sent to barcodes@cardinalhealth.com.

DSCSA Requirements:
"Unless the Secretary allows, through guidance, the use of other technologies for data instead of, or in addition to, the technologies the applicable data:
- *Shall be included in a 2-dimensional data matrix barcode when affixed to, or imprinted upon, a package*
- *Shall be included in a linear or 2-dimensional data matrix barcode when affixed to, or imprinted upon, a homogeneous case."*

Barcode Requirements

The following information (Unit, Case, Partial Case, Pallet) is taken from the HDA Bar Coding Quick Start Guide. Cardinal Health is aligned with this guidance and strict adherence will dramatically help overall integration.

Unit Level Barcodes
"As explained above, the DSCSA requires that by November 27, 2017, a manufacturer shall affix or imprint a product identifier to each package and homogenous case of a product [§ 582(b)(2)(A)]. A "product identifier" is "a standardized graphic that includes, in both a human-readable format and on a machine-readable data carrier that conforms to the standards developed by a widely recognized international standards development organization, the standardized numerical identifier [SNI], lot number, and expiration date of the product" [§ 581(14)]. The SNI is "a set of numbers or characters used to uniquely identify each package or homogenous case that is composed of the [NDC] that corresponds to the specific product (including the particular package configuration) combined with a unique alphanumeric serial number of up to 20 characters" [§ 581(20)].

To implement a product identifier that aligns with DSCSA requirements, the 2016 Quick Start Guide recommends encoding NDC [AI (01) + 14 digit GTIN], unit-level serial number [AI(21) + 1-20 digit serial number, expiration date [AI(17)+ 6 digit date in YYMMDD format] and lot number [AI(10) +1-20 alphanumeric lot number] using the 2D GS1 DataMatrix (referred to in this document as "GS1 DataMatrix") Bar Code. A valid day should be used in the AI (17) six digit date so that the expiration date encoded exactly matches electronic data passed between trading partners.

The combination of GTIN + Serial Number (SGTIN) must be unique to comply with the DSCSA."

HDA recommends encoding the data in this fashion. Refer to the Quick Start Guide for more details.

<FNC> + AI (01) + GTIN + AI (21) + Serial Number + <FNC1> + AI (17) + Expiration Date + AI (10) + Lot Number

Scan of GS1 DataMatrix code produces following string without parentheses:

(01)00300930000003(21)100000000478(17)150131(10)12345678

GTIN Number (01): 00300930000003
Serial Number (21): 100000000478
Expiration Date (17): 150131
Batch Number (10): 12345678

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

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Case Level Barcodes - Homogenous Full Case

"In accordance with the DSCSA, the 2016 Quick Start Guide recommends encoding NDC [AI (01) + 14 digit GTIN], serial number [AI (21) +1-20 digit serial number], expiration date {AI (17) + 6 digit date in YYMMDD format] and lot number [AI (10) + 1-20 alphanumeric lot number] and case quantity [AI(30) + 1-8 digit case quantity] using two GS1-128 bar codes and one GS1 Data Matrix. Inclusion in the GS1 DataMatrix symbol of the explicit case quantity represented by AI(30) is not in accordance with GS1 General Specifications and GS1 standards no longer permit it. However, during a transition period where the historical GS1-128 primary and secondary linear bar code symbols are still in use, the inclusion of case quantity using AI(30) in the secondary linear bar code will continue to be the recommended practice.

The combination of GTIN + serial number (SGTIN) must be unique to comply with the DSCSA.

The 2016 Quick Start recommends a case label format that includes two distinct GS1-128 bar codes on the label (one placed directly above the other) and one GS1 DataMatrix bar code. The primary case GS1- 128 bar code (bottom bar code) encodes the GTIN and the case serial number. The secondary case bar code (top bar code) encodes the expiration date, lot number, and quantity. The GS1 DataMatrix bar code combines all data elements from both primary and secondary GS1-128 bar codes.

HDA suggests that the encoded data in the case primary GS1-128 bar code could appear as:
>   *<FNC1>+ AI (01) + GTIN + AI (21) + serial number*

The FNC1 is used to indicate that this is a GS1 Data Matrix.
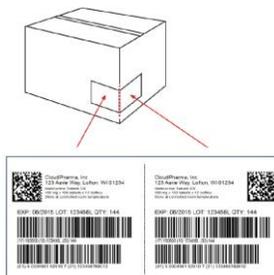
HDA suggests that the encoded case secondary GS1-128 bar code could appear as:
>   *<FNC1> + AI (17) + Expiration Date + AI (10) + Lot Number + <FNC1> + AI (30) + Case Quantity*

The first FNC1 is used to indicate that this is a GS1 Data Matrix. The second FNC1 (transmitted by the scanner as the character Group Separator, and often denoted by the convention "<GS>" or "GS") is used to terminate the variable length serial number prior to starting the next AI. Since the case quantity is last data element encoded in the bar code it is unnecessary to terminate this variable-length field using FNC1. The parentheses are not encoded in the bar code — they are only shown in a human-readable format."
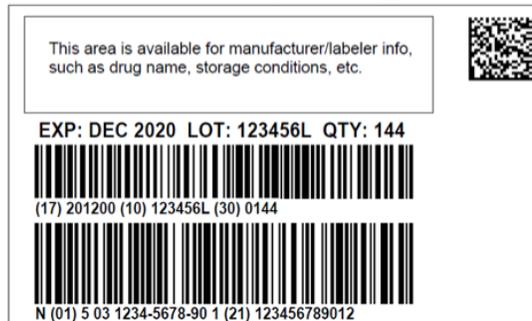
"The 2016 Quick Start Guide recommends product identification labels on two adjacent sides of the case. This can be achieved by using a wraparound label or using two separate but identical labels on adjacent sides."

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

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<u>Partial Case Label</u>
"The 2016 Quick Start Guide recommends for partial case labels including at a minimum a GS1 Serial Shipping Container Code (SSCC) and the word "partial." It is recommended that partial case labels not include a secondary linear bar code so that the design looks distinct from that of a homogenous full case."
<FNC1>+ AI (00) + SSCC

<u>Pallets</u>
"The 2016 Quick Start Guide further recommends the SSCC label for pallets shipped by ground freight carriers. A logistics unit could be a pallet, a case or a tote.

The encoded logistics/SSCC GS1-128 bar code should appear as:"
<FNC1>+ AI (00) + SSCC

1. Ship-From Information
Enter the origin address
Rec'd Font Size 10-12pt; Area 1" x 1 ¾"

2. Ship-To Information
Enter the customer warehouse address
Rec'd Font Size 10-12pt; Area 1" x 2 ¼"

3. Ship-To Postal Code
Enter as shown, with bar code of zip code below
Rec'd Font Size 10-12pt; Area 1" x 2"

4. Shipper Information
Include four-digit SCAC code of carrier, route (opt),
bill of lading or carrier/PRO number
Rec'd Font Size 10-12pt; Area 1" x 2"

5. PO Number
Enter the customer PO number with bar code of the
number below
Rec'd Font Size 20-24pt; Area 1"x 4"

6. Expanded Supplier Name
Enter the first seven characters of the supplier's name
Rec'd Font Size 36-40pt; Area 1" x 2 ¾"

7. Customer Warehouse ID
Enter the four-digit Customer warehouse number
(first four digits from PO number)
Rec'd Font Size 36-40pt; Area 1" x 1 ¼"

8. SSCC
Enter the SSCC Identifier with large bar code below
Rec'd Font Size 18-22pt; Area 2" x 4"

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Cardinal Health Technical Requirements for Serialization

Master Data

The following data is necessary for Cardinal Health to receive EPCIS events. While we likely have your mater data in our ERP, we will need to begin collecting GTIN and GLN information for EPCIS exchange.

When you are ready to test we will need GLN and Product data listed below and will provide you a spreadsheet for the exchange:

Product: GTIN (14), NDC, Drug Name, Strength, Dosage, and Container Size.
Location (seller): GLN, SGLN, Company Prefix, Business Name, Address Line 1, Address Line 2, City, State/Territory and Zip Code.

** If you do not have a GLN we advise you obtain one through GS1; however HIN or DEA can be used. This must be the identifier of the manufacturer and not that of the contract manufacturer.

Cardinal Health location (GLN and SGLN) information will be provided in the spreadsheet mentioned above. For initial testing you can use our Corporate GLN for your EPCIS Destination List.
GLN: 0096295000009
SGLN: urn:epc:id:sgln:0096295.00000.0
Cardinal Health, 7000 Cardinal Place, Dublin, OH, 43017

EPCIS Events and Examples

Cardinal Health accepts GS1 EPCIS events for the purpose of receiving information about serial numbers on drugs shipped from suppliers. Event files must contain standard GS1 EPCIS events that are structured and extended as documented in the "GS1 US HealthCare Implementation Guide" document from GS1 US.

At this time our EPCIS solution has version 1.1 implemented.

We will implement 1.2 when our software provider releases an upgrade which we expect late 2017. If you are currently at EPCIS 1.2, we may be able to map your 1.2 to 1.1 temporarily.

If you have EPCIS 1.0 we may be able to work with you provided:
- You use the 1.1 namespaces.
- You do not have any non-standard extension tags (sap, e.g.).
- You encapsulate the Lot and Expiration in the <extension><ilmd> tags in the Commission event. While that will help exchange serial numbers, that may not be sufficient for DSCSA compliance if that is your goal.

Our hope is that the industry moves to version 1.2 together and continue to look to GS1 as they refine the standard for DSCSA.

EPCIS Event Requirements

The following requirements are a mix of Cardinal Health requirements and those found in the "GS1 US HealthCare Implementation Guide" document that we want to underscore. Following this are event examples to illustrate.

- Before we can begin receiving EPCIS events we will need to receive your product and location master data, unless you plan to pass your master data in the EPCIS file itself. As mentioned above, we will provide a detailed spreadsheet in which both parties can define and reference master data. Contact us at EPCISsupport@cardinalhealth.com for more information once you are ready to engage in testing.

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

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- All EPCIS sent must conform to GS1 EPCIS Healthcare Implementation standard and we expect trading partners to validate them for accuracy **before** submitting them to Cardinal Health.
- Commission events (Object event, Bizstep "commissioning") are required.
  - o EPC lists should be used for specific Lot and Expiration to minimize file size.
  - o Since we will be exchanging product master data in the spreadsheet, there is no hard requirement to encode Trade Item Master Data in the Commission event unless that is your goal.
- Aggregation events (Aggregation event, Bizstep "packing") are required.
  - o The timestamp of any serial number involved in the Aggregation event must chronologically succeed the timestamp of its corresponding Commission event.
- Shipping events (Object event, Bizstep "shipping") are required.
  - o In the Shipping event extension we require a minimum of source and destination SGLNs. Cardinal Health SGLNs can be found in the Master Data spreadsheet.
  - o Shipping Event bizTransactionList MUST include PO number.
  - o The timestamp of any serial number involved in the Shipping event must chronologically succeed the timestamp of its corresponding Aggregation event (if specified) and/or its corresponding Commission event.
  - o Shipping event should contain the outermost container serial numbers only (typically pallets, e.g.).
- Within the document, events are to be arranged in the order commission, packing, and shipping.
- All serial numbers in the shipping and packing events must be present in commission event.
- If sending Shipping events as well as Aggregation events, only send the EPCs of the outermost packaging of container serial numbers in the shipping event (most likely that of the case or pallet).
- The full packaging hierarchy must be expressed in the Packing event provided.
- Serial numbers are to be in SGTIN EPC URI format.

EPCIS 1.1 Example:

In the following example, serial numbers 2000217 (unit), 2000218 (unit) and 408 (case) are commissioned. 2000217 and 2000218 are aggregated into 408. Then serial numbers 1130242 (unit), 1130243 (unit) and 1516 (case) are commissioned. 1130242 and 1130243 are aggregated into 1516. Last, 41516 (SSCC) is commissioned and cases 408 and 1516 are aggregated into 41516.

```xml
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
<epcis:EPCISDocument xmlns:sbdh="http://www.unece.org/cefact/namespaces/StandardBusinessDocumentHeader"
xmlns:gs1ushc="http://epcis.gs1us.org/hc/ns" xmlns:epcismd="urn:epcglobal:epcis-masterdata:xsd:1" xmlns:epcis="urn:epcglobal:epcis:xsd:1"
schemaVersion="1.1" creationDate="2016-09-15T09:44:54-04:00">
    <EPCISBody>
        <EventList>
            <ObjectEvent>
                <eventTime>2016-09-15T09:44:54Z</eventTime>
                <eventTimeZoneOffset>05:00</eventTimeZoneOffset>
                <epcList>
                    <epc>urn:epc:id:sgtin:030009.0513502.2000217</epc>
                    <epc>urn:epc:id:sgtin:030009.0513502.2000218</epc>
                    <epc>urn:epc:id:sgtin:030009.3513502.408</epc>
                </epcList>
                <action>ADD</action>
                <bizStep>urn:epcglobal:cbv:bizstep:commissioning</bizStep>
                <disposition>urn:epcglobal:cbv:disp:active</disposition
                <bizLocation>
                    <id>urn:epc:id:sgln:030014.000002.0</id>
                </bizLocation>
                <extension>
                    <ilmd>
                        <gs1ushc:lotNumber>LOTDOC</gs1ushc:lotNumber>
                        <gs1ushc:itemExpirationDate>2016-09-30</gs1ushc:itemExpirationDate>
                    </ilmd>
                </extension>
            </ObjectEvent>
            <AggregationEvent>
                <eventTime>2016-09-15T09:44:55Z</eventTime>
                <eventTimeZoneOffset>-05:00</eventTimeZoneOffset>
                <parentID>urn:epc:id:sgtin:030009.3513502.408</parentID>
```

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

```xml
        <childEPCs>
            <epc>urn:epc:id:sgtin:030009.0513502.2000217</epc>
            <epc>urn:epc:id:sgtin:030009.0513502.2000218</epc>
        </childEPCs>
        <action>ADD</action>
        <bizStep>urn:epcglobal:cbv:bizstep:packing</bizStep>
        <disposition>urn:epcglobal:cbv:disp:in_progress</disposition>
        <bizLocation>
            <id>urn:epc:id:sgln:030014.000002.0</id>
        </bizLocation>
    </AggregationEvent>
    <ObjectEvent>
        <eventTime>2016-09-15T09:44:56Z</eventTime>
        <eventTimeZoneOffset>-05:00</eventTimeZoneOffset>
        <epcList>
            <epc>urn:epc:id:sgtin:030009.0307301.1130242</epc>
            <epc>urn:epc:id:sgtin:030009.0307301.1130243</epc>
            <epc>urn:epc:id:sgtin:030009.3307301.1516</epc>
        </epcList>
        <action>ADD</action>
        <bizStep>urn:epcglobal:cbv:bizstep:commissioning</bizStep>
        <disposition>urn:epcglobal:cbv:disp:active</disposition>
        <bizLocation>
            <id>urn:epc:id:sgln:030014.000002.0</id>
        </bizLocation>
        <extension>
            <ilmd>
                <gs1ushc:lotNumber>LOTDOC</gs1ushc:lotNumber>
                <gs1ushc:itemExpirationDate>2016-09-30</gs1ushc:itemExpirationDate>
            </ilmd>
        </extension>
    </ObjectEvent>
    <AggregationEvent>
        <eventTime>2016-09-15T09:44:57Z</eventTime>
        <eventTimeZoneOffset>-05:00</eventTimeZoneOffset>
        <parentID>urn:epc:id:sgtin:030009.3307301.1516</parentID>
        <childEPCs>
            <epc>urn:epc:id:sgtin:030009.0307301.1130242</epc>
            <epc>urn:epc:id:sgtin:030009.0307301.1130243</epc>
        </childEPCs>
        <action>ADD</action>
        <bizStep>urn:epcglobal:cbv:bizstep:packing</bizStep>
        <disposition>urn:epcglobal:cbv:disp:in_progress</disposition>
        <bizLocation>
            <id>urn:epc:id:sgln:030014.000002.0</id>
        </bizLocation>
    </AggregationEvent>
    <ObjectEvent>
        <eventTime>2016-09-15T09:44:58Z</eventTime>
        <eventTimeZoneOffset>-05:00</eventTimeZoneOffset>
        <epcList>
            <epc>urn:epc:id:sscc:030009.41516</epc>
        </epcList>
        <action>ADD</action>
        <bizStep>urn:epcglobal:cbv:bizstep:commissioning</bizStep>
        <disposition>urn:epcglobal:cbv:disp:active</disposition>
        <bizLocation>
            <id>urn:epc:id:sgln:030014.000002.0</id>
        </bizLocation>
        <extension>
            <ilmd>
                <gs1ushc:lotNumber>LOTDOC</gs1ushc:lotNumber>
                <gs1ushc:itemExpirationDate>2016-09-30</gs1ushc:itemExpirationDate>
            </ilmd>
        </extension>
    </ObjectEvent>
    <AggregationEvent>
        <eventTime>2016-09-15T09:44:59Z</eventTime>
        <eventTimeZoneOffset>-05:00</eventTimeZoneOffset>
        <parentID>urn:epc:id:sscc:030009.41516</parentID>
        <childEPCs>
            <epc>urn:epc:id:sgtin:030009.3513502.408</epc>
            <epc>urn:epc:id:sgtin:030009.3307301.1516</epc>
        </childEPCs>
        <action>ADD</action>
        <bizStep>urn:epcglobal:cbv:bizstep:packing</bizStep>
        <disposition>urn:epcglobal:cbv:disp:in_progress</disposition>
        <bizLocation>
            <id>urn:epc:id:sgln:030014.000002.0</id>
        </bizLocation>
```

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

```
            </AggregationEvent>
            <ObjectEvent>
                <eventTime>2016-09-15T09:45:00Z</eventTime>
                <eventTimeZoneOffset>-05:00</eventTimeZoneOffset>
                <epcList>
                    <epc>urn:epc:id:sscc:030009.41516</epc>
                </epcList>
                <action>OBSERVE</action>
                <bizStep>urn:epcglobal:cbv:bizstep:shipping</bizStep>
                <disposition>urn:epcglobal:cbv:disp:in_transit</disposition>
                <bizTransactionList>
                    <bizTransaction type="urn:epcglobal:cbv:btt:po">PO1</bizTransaction>
                </bizTransactionList>
                <extension>
                    <sourceList>
                        <source type="urn:epcglobal:cbv:sdt:owning_party">urn:epc:id:sgln:030014.000002.0</source>
                    </sourceList>
                    <destinationList>
                        <destination type="urn:epcglobal:cbv:sdt:owning_party">urn:epc:id:sgln:0096295.00000.0</destination>
                    </destinationList>
                </extension>
            </ObjectEvent>
        </EventList>
    </EPCIS Body>
</epcis:EPCISDocument>
```

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.

Cardinal Health Technical Requirements for Serialization

EPCIS Event Exchange Options

Cardinal Health AS2 Profile Information for EPCIS Event Files

This profile provides the URL and server IP addresses for access through the firewall into Cardinal Health's EPCIS Event Community

Test Environment:
AS2 ID: CARDINALEPCISTEST
AS2 URL: http://stgedigateway.cardinalhealth.com:4080/exchange/CARDINALEPCISTEST

Production Environment:
AS2 ID: CARDINALEPCIS
AS2 URL: http://edigateway.cardinalhealth.com:4080/exchange/CARDINALEPCIS

- To transact, we will need your AS2 ID, AS2 URL and AS2 certificate for any production and non-production source from which you will send your EPCIS.
- If you need an AS2 certificate from Cardinal Health, please request it from the email address below. The same AS2 certificate will work for both production and non-production URLs above.
- Many, if not most AS2 solutions automatically request MDNs (acknowledgments) for file transfers by default. If your AS2 requests an MDN, Cardinal Health will send an MDN for your EPCIS transmission.
- Please send the requirements above to EPCISsupport@cardinalhealth.com.

Technical questions in applying this guide should be sent to: EPCISsupport@cardinalhealth.com.